

SCARA
Robots

YK4000 SERIES

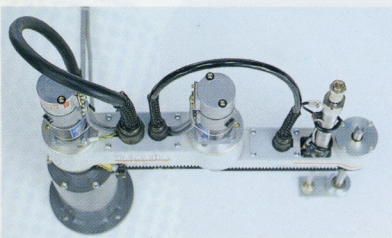


/ Compact SCARA Robots Offering a Human Im

- A** With a maximum load of 3 kg and an arm length of 400 mm, these robots can be used in a wide range of light work applications.
- B** Powerful functions available to you at a low cost.

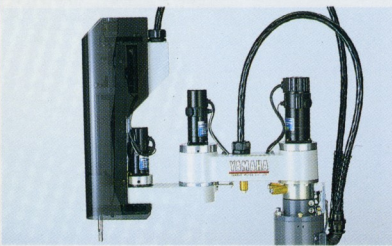
Wide Work Area

The slim shape of the trunk component and the simple design of the axes give you an ample movement range of 200° on the X axis and 270° on the Y axis, for a better operational field than ever before.



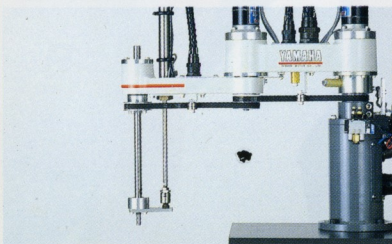
High Rigidity Means Heavier Load Transport

Designed for light weight, yet with high rigidity and power, this robot offers you a maximum load capacity of 3 kg, with a wider operational range than conventional robots.



Freely Selectable Stroke (2-axis model)

The simple construction of the LZ model, with its maximized rigidity, enables the user to select the desired Z axis stroke from among various lengths: 75, 100, 125, and 150 mm. With the standard model, the Z axis stroke can be adjusted to anywhere from 0 to 45 mm.



R Axis Direction-Holding Mechanism

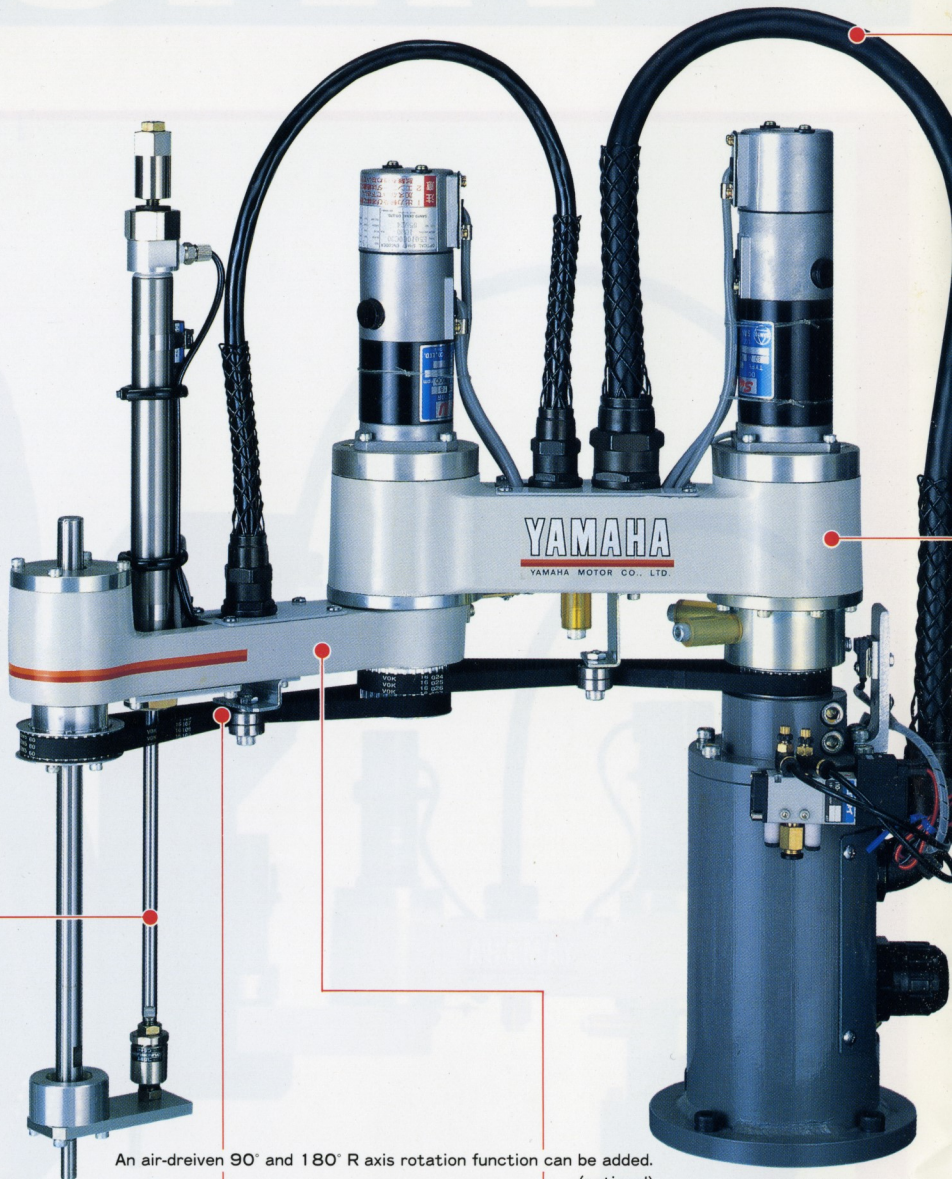
(2-axis model)

This model is equipped with a uniquely-constructed mechanism that maintains the direction of the R axis and comes as standard feature of the robot. Now picking and placing can be done without changing the orientation of the workpiece, for highly improved cost performance.



Fast Arm Speed

Despite its compact size, this robot comes with a maximum speed of 3.8 m/sec and, with the two-axis model, a 12-inch reciprocal sweep that takes only 1.1 seconds. Even better acceleration is available with the 4-axis model, with the high-speed movement of the R and Z axes allowing a standard cycle time of 1.1 seconds.

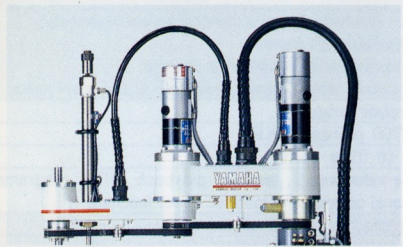


An air-driven 90° and 180° R axis rotation function can be added.
(optional)

YK4000LZ

High Reliability

With cabtire cables used for the wire harness, and quality built thoroughly into every single part of the simplified construction, you can count on easy access for maintenance and a high level of durability. The two-axis model features a built-in air pipe for air supply to the Z axis.



Lightweight and Compact

The shape of arm and the key design of the axes eliminate all unnecessary parts. Since less space is needed for installation, a large degree of freedom is available in planning system design. The weight of the main unit is only 15 kg for the two-axis model and 17.5 kg for the 4-axis model, for easier installation and relocation.



Simple Operation (2-axis model)

Point input can be handled in any of three ways: pulse value input, teaching, and direct teaching, making this one of the optimum choices for any application. The compact hand-held YPU20 programming unit is equipped with a wide-scale liquid crystal display of 20 characters \times 4 lines, for added ease of use. External memory is accessible through IC memory cards, while results can be printed out by employing a printer card.

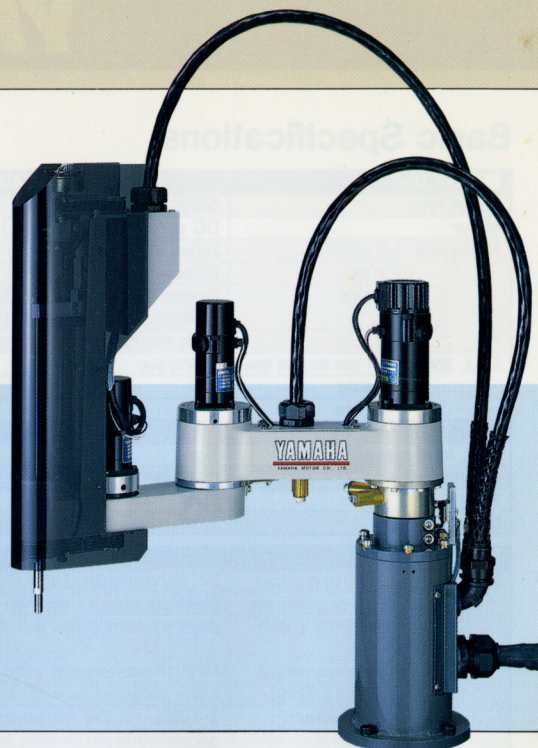


New

YK4040

4-axis model

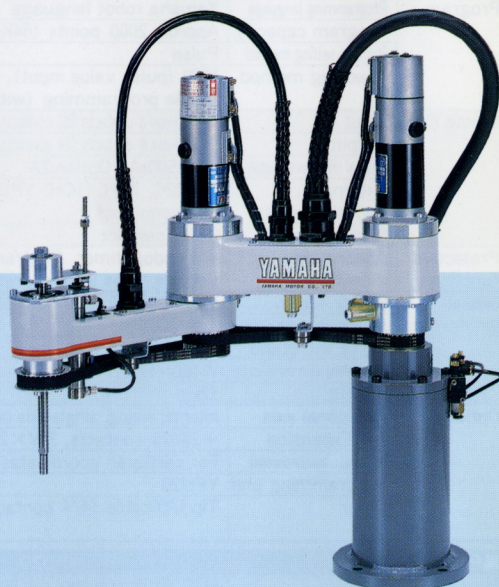
This compact 4-axis model employs a DC servo motor with even more power than that of YK4000. A maximum speed of 3.8 m/sec and high-speed arm movement work together for rapid traverse speed on the Z and R axes. Programming is handled through cartesian coordinate system teaching.



YK4000

2-axis model

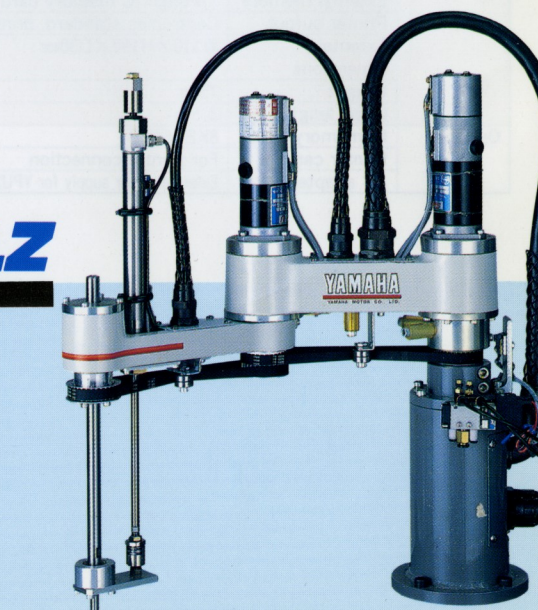
The slim and simple shape of standard model has an ample movement range of 220° on the X axis, 270° on the Y axis, and 45mm stroke on the air driven Z axis. The R axis is provided with a unique direction-holding mechanism. Programming can be done through direct teaching for simpler operation.



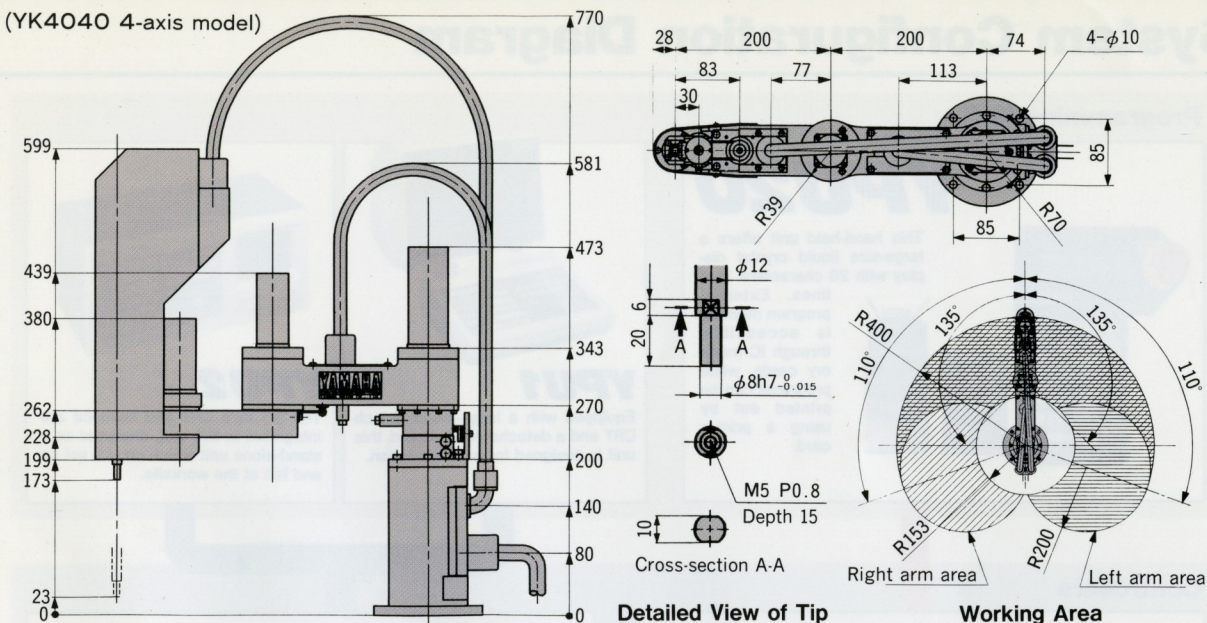
YK4000LZ

2-axis model with long Z axis stroke

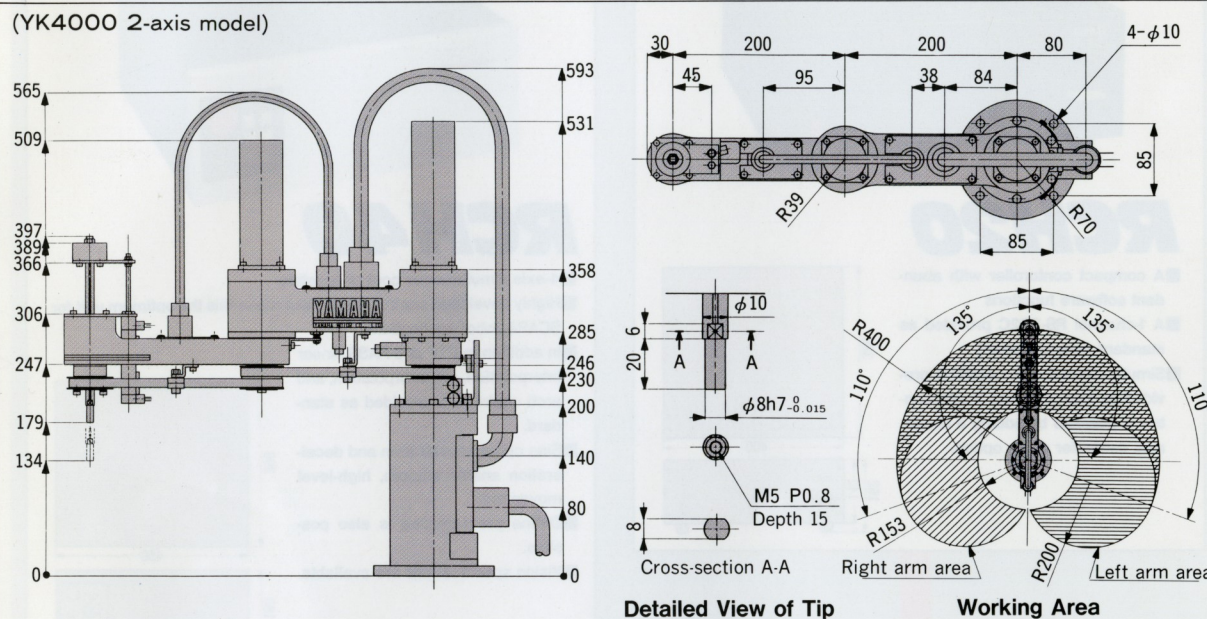
This robot is available in 75 mm, 100 mm, 125 mm, and 150 mm Z axis models, to assure coverage of a wide range of applications. The rigidity of the Z axis has been increased, and the precision of the tip has been fine-tuned.



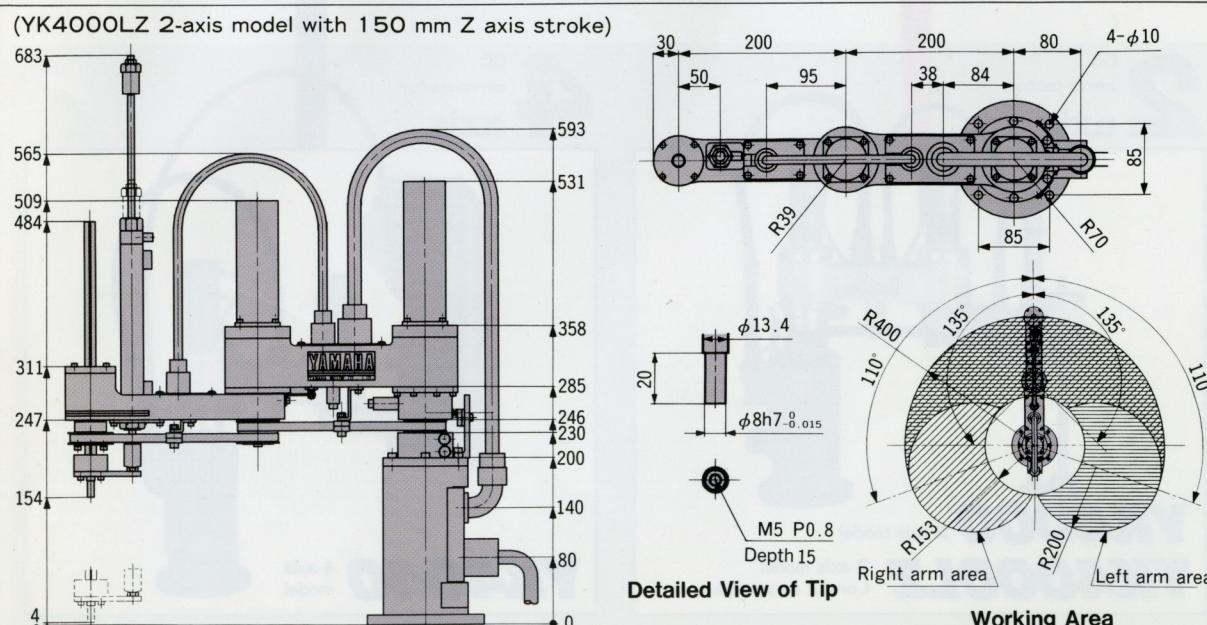
(YK4040 4-axis model)



(YK4000 2-axis model)



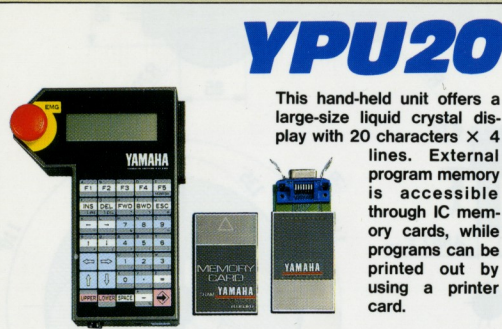
(YK4000LZ 2-axis model with 150 mm Z axis stroke)



(The YK4000LZ is also available with a 125 mm, 100 mm, and 75 mm Z axis stroke.)

System Configuration Diagram

Programming Unit



YPU20

This hand-held unit offers a large-size liquid crystal display with 20 characters x 4 lines. External program memory is accessible through IC memory cards, while programs can be printed out by using a printer card.



YPU1

Equipped with a large-model 9-inch CRT and a detachable keyboard, this unit is designed for easy operation.



YPU2

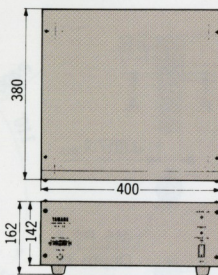
The 5.5 inch CRT and keyboard are integrated in this unit, designed as a stand-alone unit which can be set up and left at the worksite.

Controllers



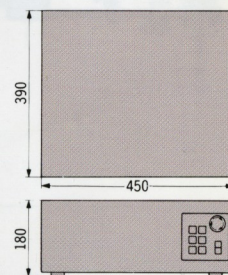
RCH20

- A compact controller with abundant software functions
- A 1-channel RS-232C provided as standard (user-released)
- Simultaneous 2-axis control is provided as standard, and 3-axis control is possible by adding a single-axis controller as an option.

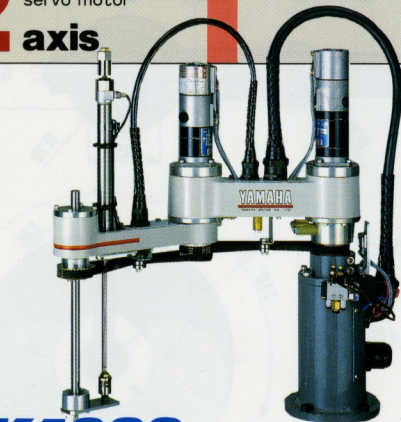


RCH40

- 4-axis simultaneous control possible
- Highly developed control capabilities make this the optimum unit for SCARA robot applications.
- In addition to PTP and PASS, linear interpolation, arc interpolation, and arch control are provided as standard.
- Sine curve acceleration and deceleration enable smooth, high-level movement.
- Offline programming is also possible.
- Vision specifications are available.



2 axis



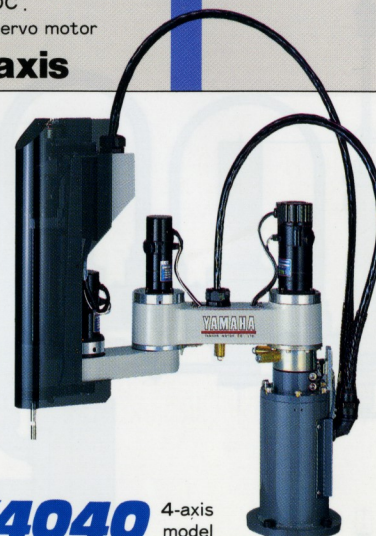
YK4000

2-axis model

YK4000LZ

2-axis model
Long Z axis stroke

4 axis



YK4040

4-axis model

Basic Specifications

Robot Unit		YK4000/YK4000LZ	YK4040	
Robot type		SCARA	SCARA	
Motor		DC servo motor (2 axes)	DC servo motor (4 axes)	
Working areas	X axis	200mm×220°	200mm×220°	
	Y axis	200mm×270°	200mm×270°	
	Z axis	Driven by air cylinder, YK4000: Stroke 0-45mm; YK4000LZ: 50-75mm, 75-100mm, 100-125mm, 125-150mm	Stroke 150 mm (DC servo)	
	R axis	With mechanism to maintain tip direction	360° (DC servo)	
Max. speed	X/Y axes resultant speed	3.8m/sec	3.8m/sec	
	Z axis		600mm/sec	
	R axis		667°/sec	
Standard cycle time		1.1sec (12-inch reciprocal cycle)	1.1sec (1-inch to 12-inch to 1-inch cycle)	
Max. load capacity		3kg	3kg	
Repeatability on X/Y axes		±0.02mm	±0.025mm	
Weight		15kg	17.5kg	
Cable length		3.5m, Optional: Tip I/O cable	3.5m	
Controller		RCH20	RCH40	
Axis control	Control method	DC servo moter, software servo	DC servo motor, software servo	
	No. of controllable axes	Simultaneous control of 2 axes; 3-axis control possible with single-axis controller (optional)	Simultaneous control of 4 axes	
	Coordinate system	Joint system: pulse display: Origin shift	Joint system: Pulse display, Cartesian system: mm display in units of 0.01 mm; Shift functin: origin shift/coordinate shift; Arm switching function: right/left arm system	
	Movement method	PTP (Point-to-point with simultaneous arrival of all axes)	PTP, PASS, CP (linear interpolation), ARC (arc interpolation), ARCH (vertical arch control)	
	Speed setting	1-100% (setting possible in 1% increments); setting also possible through program	1-100% (setting possible in 1% increments); setting also possible through program	
	Acceleration/deceleration setting	1-100% (in 1% increments) through acceleration/deceleration parameter; setting also possible through program	1-100% (in 1% increments) through acceleration/deceleration parameter; setting also possible through program. Automatic acceleration setting through weight parameter. Zone control (automatic setting of optimum acceleration in response to arm position)	
	Program	Programming language	Yamaha robot language	Yamaha robot language
	Program capacity	Approx. 2000 points (64KB)	Approx. 2700 points (64KB)	
	Position setting method	Pulse	Pulse, mm (0.01mm units)	
	Teaching method	MDI (pulse value input), teaching playback, direct teaching, offline programming (with personal computer)	MDI (pulse value input), teaching playback, offline programming (with personal computer); Optional: direct teaching	
External I/O	Input	General-use 8 contacts (32 contacts optional), special-use 6 contacts	General-use 8 contacts (40 contacts optional), special-use 8 contacts	
	Output	General-use 8 contacts (24 contacts optional), special-use 5 contacts	General-use 8 contacts (32 contacts optional), special-use 8 contacts	
	External drive power supply	24V, 500mA, Option:2A	24V, 1A	
	External communications	RS232C, 2CH (1CH: YPU20 or host communications, 1CH: additional axis)	RS-232C, 2CH (1CH: host communications, 1CH: external memory device or printer)	
	Brake output	Relay contact	Relay contact	
Protective functions	Abnormality detection	Watchdog timer, CPU/encoder/driver/sequencer voltage (24V) abnormalities, drop in battery voltage or power supply voltage, rises in temperature, travel limit (both soft limit and hard limit)		
General specifications	Power supply	100, 120, 200, 220, 240VAC±10%, single-phase 50/60 Hz	100, 110, 120, 200, 210, 220, 230, 240VAC±10%, single-phase 50/60Hz	
	Power capacity	800VA	2.0KVA	
	Noise withstand	1500V, 1μsec	1500V, 1μsec	
	External dimensions	W400×H162×D380mm	W450×H180×D390mm	
	Weight	12kg	30kg	
Options	Additional axis	Internal wiring, single-axis controller and connection cable (1m)		
	I/O Expansion	+24/16 contacts, 24V×2A, I/O cable	+32/24 contacts	
	High-speed calculation processor	For cartesian coordinates (mm setting)	Standard equipment	
	Programming unit	YPU20	YPU-1, YPU-2, teaching box (for point data teaching)	
	Other	Tip I/O cable (4/4 contacts), single-axis controller	Direct teaching, robot long cable (5m) CUP (software for communications with personal computer)	
Programming unit		YPU20	YPU1	YPU2
Main unit	Display	LCD 20 characters×4 lines	CRT 9-inch (autonomous model)	CRT 5.5-inch (joined to keyboard)
	Emergency stop	With lock, mushroom-shaped, B contact	With lock, mushroom-shaped, A contact	With lock, mushroom-shaped, A contact
	External communications	RS-232C, 1CH, communication with controller or personal computer		
	External memory	Through IC memory card		
	Printer output	Centronics standard, printer card use		
	External dimensions	W110×H190×D30mm	Keyboard: W244×H65×D206mm CRT: W276×H210×D267mm	W400×H190×D215mm
	Weight	750g	Keyboard: 1.6kg, CRT: 3.9kg	5kg
	Cable length	3.5m	1.7m	1.7m
	Options	IC memory card	8KB, 64KB	
	Printer card	For printer connection		
	AC adapter	External power supply for YPU20: 9V, 200mA		

● Specifications and Appearance are subject to change without prior notice (January 1991)

YAMAHA
YAMAHA MOTOR CO., LTD.

IM DIVISION
1280 Nakajo, Hamakita, Shizuoka 434, Japan
Telephone 81-53-587-1119 Telefax 81-53-586-6848